Ultima 2M
Video Wall Controller

PICMG 1.3 Configuration User Guide

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INTRODUCTION

COMPANY PROFILE

Blue Chip Technology is a leading specialist PC product manufacturer in Europe, providing innovation with quality design and manufacturing from a single source.

Based in the North West of England, our purpose built complex contains both advanced research and development facilities, and manufacturing facilities.

Specialising in the provision of industrial computing and electronic solutions for a wide range of UK and European organisations, Blue Chip Technology has one of the UK's largest portfolios of industrial PCs, Industrial PCs, peripherals and data acquisition cards. This extensive range of products, coupled with our experience and expertise, enables Blue Chip Technology to offer an industrial processing solution for any application. This is one of the products from our portfolio, providing you with a cost effective product development and volume production tool.

A unique customisation and specialised system integration service is also available, delivering innovative solutions to customers problems. The company's success and reputation in this area has led to a number of large design and manufacturing projects for major companies.

British Standards Institute approval (BS EN 9001) means that all of Blue Chip Technology's design and manufacturing procedures are strictly controlled, ensuring the highest levels of quality, reliability and performance.

Blue Chip Technology are committed to the single European market, and continue to invest in the latest technology and skills to provide high performance computer and electronic solutions for a world-wide customer base.

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REGULATORY STATEMENTS

CE
This product meets the essential protection requirements of the European EMC Directive (2004/108/EC) and the Low Voltage Directive (2006/95/EC), and is eligible to bear the CE mark.

> **Warning**
>
> This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

FCC
NOTE:
This equipment has been designed to meet the requirements of a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at their own expense.

WARNING:

Changes or modifications not expressly approved by the manufacturer could void the user's authority to operate the equipment.

RELATED PUBLICATIONS

The following publications will provide useful information related to the Standard Personal Computer and can be used in conjunction with this manual.

- IBM Personal Computer AT Technical Reference, 1502494, IBM, 1984.
- IBM Personal System/2 and Personal Computer BIOS Interface Technical Reference, 15F0306, IBM, 1987.
- The Programmers PC Sourcebook, Microsoft
- The Winn L. Rosch Hardware Bible, Brady

TRADEMARKS

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MS-DOS and WINDOWS are registered trademarks of the Microsoft Corporation.

Linux is a registered trademark of Linus Torvalds.

ATA-Disk Chip is a trademark of Silicon Storage Technology Inc.

PRECAUTIONS

Certain precautions are necessary when designing with, handling, and using circuit boards. ***It is imperative that precautions are taken at all stages to avoid electro-static discharges, which will damage boards. Those boards fitted with an on-board lithium battery must be handled carefully to avoid maltreatment of the battery that could create a hazard.***

ELECTRO-STATIC DISCHARGES

Some of the devices within the Industrial PC can be totally destroyed by static electricity. Also bear in mind that the damage caused by static electricity may be partial and not immediately obvious. This could have an effect on your product's reliability and warranty. Ensure that you take necessary static precautions; ideally you should wear an approved wrist strap or, if that is not possible, touch a suitable ground to discharge any static build up. This should be repeated if the handling is for any length of time.

When carrying any boards around, please place them into anti-static bags. This will prevent any static electricity build up. If the board has an on-board battery, do not use black anti-static bags because these tend to be conductive and will discharge any on-board battery.

ON-BOARD BATTERY

The Ultima 2M contains a Processor board with an on-board lithium cell connected. To that end the following precautions apply and should be observed. If the battery is mistreated in any way there is a very real possibility of fire, explosion, and harm. Great care should be taken with this type of battery. Under NO circumstances should it be:

- short-circuited
- exposed to temperatures in excess of 100 ºC or burnt
- immersed in water
- unsoldered
- recharged
- disassembled

Expired batteries remain hazardous and must be disposed of in a safe manner.

BIOS & CMOS RAM

Please be aware that on Industrial PC products, it is possible to create configurations within the CMOS RAM that make booting impossible. If this should happen, clear the CMOS settings, (see the description of the Jumper Settings on the Processor board being used for details).

ELECTROMAGNETIC COMPATIBILITY

This product has been assessed operating in representative, standard configurations. As with any PC product, however, final installation & configuration can vary significantly, and so the following guidelines are offered to help ensure that compatibility is maintained.

- All components added to a system should either carry appropriate equivalent levels of compliance, or be tested for compliance as part of the final system, and should be installed in accordance with supplier recommendations.
- The external enclosure should be securely fastened (with standard lids and covers in place) to ensure good metal-to-metal contact around the internal electronics
- Any metal back plate must be securely screwed to the chassis of the computer to ensure good metal-to-metal (i.e. earth) contact.
- Metal, screened, connector bodies should be securely connected to the enclosure.
- The external cabling to boards causes most EMC problems. It is recommended that any external cabling to the board be totally screened, and that the screen of the cable connects to the metal end bracket of the board or the enclosure and hence to earth. Round, screened cables with a braided wire screen are used in preference to those with a foil screen and drain wire. Wherever possible, use metal connector shells that connect around the full circumference of the cable screen: they are far superior to those that earth the screen by a simple "pig-tail".
- The keyboard and mouse will play an important part in the compatibility of the processor card since they are ports into the board. Similarly, they will affect the compatibility of the complete system. Fully compatible peripherals must be used otherwise the complete system could be degraded. They may radiate or behave as if keys/buttons are pressed when subject to interference. Under these circumstances it may be beneficial to add a ferrite clamp on the leads as close as possible to the connector. A suitable type is the Chomerics type H8FE-1004-AS.
- USB cables should be high quality screened types.
- Ensure that the screens of any external cables are bonded to a good RF earth at the remote end of the cable.
- An earth stud is available on the back of the unit to improve grounding in extreme environments

Failure to observe these recommendations may invalidate the EMC compliance.

GETTING STARTED

MANUAL ORGANISATION

This manual describes the Blue Chip Technology ULTIMA 2M Video Wall Controller.

We have tried to include any unique information relying on end users to be computer literate and experienced in configuring hardware and software in a PC environment. The manual is sectioned as follows:

Overview, listing the Chassis's features and specification;
Layout, and dimensional details;
Installation, and associated issues;

We strongly recommend that you study this manual carefully before attempting to interface with the ULTIMA 2M PC or change the standard configurations. Whilst all the necessary information is available in this manual we would recommend that unless you are confident, you contact your supplier for guidance. ***IT IS PARTICULARLY IMPORTANT THAT YOU READ THE SECTION 'PRECAUTIONS' BEFORE HANDLING ANY BOARDS.***

If you have any suggestions or find any errors concerning this manual and want to inform us of these, please contact our Technical Services department with the relevant details.

OVERVIEW

INTRODUCTION

The ULTIAM 2M is small ruggedised PC compatible microcomputer designed for reliable operation. The unit has been designed specifically for use with the Matrox Mura range of Video Wall Controller cards. It is available as a desktop unit. The machine is cooled internally by optionally filtered air, which enters through the front panel and exits at the rear. Access to boards is by a removable side cover. Connections to the boards are made at the rear of the chassis.

FEATURES

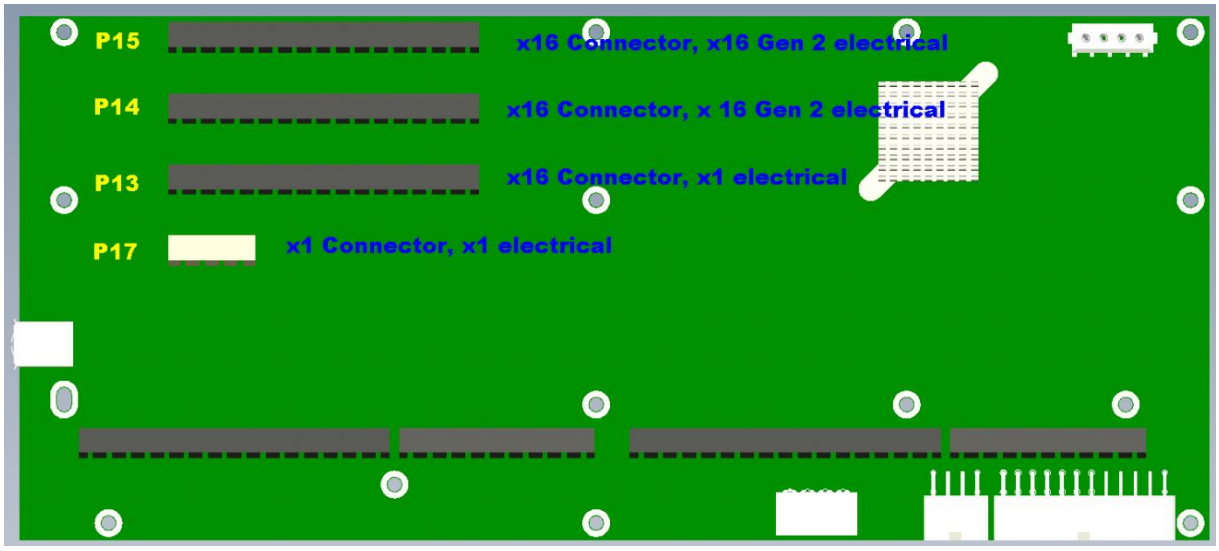
- Robust polished stainless steel chassis using recognised electromagnetic compatible (EMC) emission and immunity design techniques.
- PICMG 1.3 compliant.
- Switch mode power supply unit
- Optional Dual Redundant version available
- Optionally Filtered air through a single 120 x 25 mm, 12V DC fans mounted behind the front cover.
- Quick access to the air filter. The filter is a coated polyester material of 30 PPI porosity having a flammability rating to UL94 Class V0.
- Card retention mechanism.
- Each system is supplied configured to order. The System Release Documentation details each particular system's configuration

ULTIMA 2M PICMG 1.3 SPECIFICATION

The following list describes the default and optional configurations available

- Single Board Computer
  - LGA1150 for 4th Generation Intel Core i7/i5/i3 processors
  - Intel Q87 PCH
  - Dual DDR3 DIMM supporting up to 16GB memory
  - Dual 10/100/1000Mbps Ethernet
- Passive PICMG 1.3 Backplane
  - 3 PCI Express x16 slots (2 x 16 lanes plus 1 x 1 lane)
  - 1 PCI Express x 1 slots
- Storage
  - 1 x 6Gbps SATA 3.5”
  - 2 x 6Gbps SATA 2.5” via optional removable caddy
- 4 USB
  - 2 Rear USB 3.0 (on SBC)
  - 2 Rear USB 2.0
  - 2 additional USB 3.0 Ports available via header on SBC (Optional Fit via cable and would use one I/O slot)
- 1 RS232
  - 9 way D-type
- 1 HD Codec Audio ALC662 (optional fit)
  - MIC In / Line In / Line Out
- ATX Power Supply
  - Option 1: 300W ATX
  - Option 2: 300W Dual Redundant configuration
- High Capacity 120 x 25mm Chassis Fans
  - Speed Control available
- Matrox P690 Graphics Card
  - Optional as Control Monitor via PCI Express Port
- Matrox Mura
  - Optional As required
  - Up to 2 Mura Cards supported
- Support for further PCI Express x 1 Adapter card
- Dimensions
  - 440mm x 222mm x 155mm Standard PSU
  - 452mm x 222mm x 155mm Dual Redundant PSU
  - Allow approx 8mm to height (222mm) for additional of feet

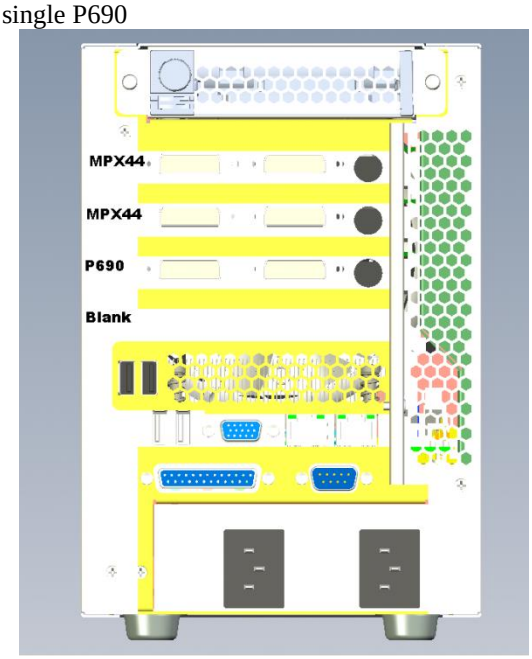
BACKPLANE LAYOUT



The picture above shows the slot layout on the backplane.
When installing Matrox Mura cards into the backplane, they should be installed in the following order

Backplane Connector	Matrox Card	Example	
		Card	Output
P15	Card 2	MPX40	C1, C2, D1, D2
P14	Card 1	MPX40	A1, A2, B1, B2
P13	P690		
P17	PCI Express x 1		

Example 1: 2 Mura Cards with single P690



BACKPLANE LED'S

The LED's on the backplane indicate the speed of each PCI Express x 16 slot.

The 0GD Led should always be Full On and should not flash indicating that it has synced at full Gen 2 speeds.

When operational, all Power LED's should be lit.

Slot:	***LED:***	Full 'on' – PCIe[x16] sync at Gen 2 0.5s 'on'/0.5s 'off' – some PCIe lanes sync at Gen 2 1.5s 'on'/0.5s 'off' – PCIe[x16] sync at Gen 1 0.5s 'on'/1.5s 'off' – some PCIe lanes sync at Gen 1
SHB	Port 0	
P14	Port 4	
P15	Port 8	
Fatal error	F'TL ERR	

CHASSIS FEATURES

CHASSIS

The basic chassis comprises the following:

Chassis body including the cooling fan assembly
Front Bezel and Fan Filter assembly
Chassis front panel
Chassis covers (two sides and one top)

The Chassis metalwork is of stainless steel construction with riveted fitments. Removable items are fixed by screws. The Front Bezel and Fan filter assembly are of Painted Zintec construction

Fitted internally are PSU, cooling fan, Single Board Computer, passive back plane and HDD.

The front panel is a magnetic contact hold for easy access to the air filter if fitted

CHASSIS SPECIFICATION

Chassis

Polished stainless steel chassis
Air filter approved to UL94 V-0

Temperature	Non-Operating	-20 ºC to +70 ºC	
	Operating (1)	+0 ºC to +45 ºC	[Chassis + SBC]
	Operating (2)	+0 ºC to +35 ºC	[With Mura Cards Fitted]

Note1: Unit should not be started at temperatures less than 5ºC as items with mechanical parts, such as the HDD, may not operate correctly at such low temperatures resulting in damage

Note2: Max Temperature changes are restricted to ± 20ºC per hour as damage to HDD's resulting in data loss may occur above this rate of change

Humidity

0-90 %RH non-condensing

Shock:

(IEC 68-2-27)
Operating 5G 11 ms, ½ sine wave
Non-operating 15G 11ms, ½ sine wave

Vibration:

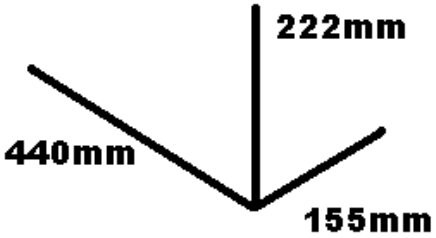
(IEC 68-2-6)
Operating 5 to 500 Hz, 0.5G
Non-operating 5 to 500 Hz, 2.0G

Safety

Designed to meet EN 60950

CHASSIS LAYOUT

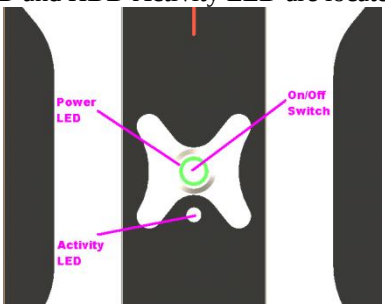
The desktop unit is shown below



Notes: 1.Allow an additional 8mm for feet
2. Dual redundant PSU adds additional 12mm to depth (452mm)
3. For depth, additional space is required for cables. The Matrox Mura cable is quite stiff and up to 150mm should be allowed for bend of the cable without damage

FRONT PANEL

The System On/Off control, Power LED and HDD Activity LED are located on the front panel.



Behind the panel is access to the air filter.

REAR PANEL

All electrical connections to the ULTIMA are made at the rear of the unit. Units are configured individually to requirements. Refer to the System Release Documentation for details of a particular PC configuration.

POWER SUPPLY & BBU

The chassis can be fitted with a variety of ATX style Power Supplies.
Some PSUs may have switchable input voltage range. In these cases the following warning should be observed.

> **WARNING**
> Selection of the wrong voltage may cause permanent damage to the unit. Ensure that the switch is correctly set for the installation supply before connecting to the supply. If the wrong voltage is applied to the unit the internal fuse may protect the ULTIMA. However, this cannot be guaranteed. Blue Chip Technology accepts no responsibility for the consequences of operating the unit on the wrong supply.

Note: for the Dual Redundant power supply, if the audible alarm sounds, it indicates that either one of the modules is faulty or that the power to the module is not present. To disable the audible alarm, remove the suspect module [the LED on the "good" module will be solid Green in colour]

QUICK START GUIDE

If the Ultima 2M is provided with an operating system installed, the operating system will require setup and activation first.

IMPORTANT: Once powered on for the first time - Do not power off the unit until the Operating system has completed the Microsoft Mini-setup process or corruption could occur to the OS requiring re install.

It is important that before powering on the unit for the first time that a display is attached to the relevant primary display output. This output can be identified as follows:

If no additional graphics cards are installed, then the primary display output will be the VGA port on the single board computer, as shown on the left.

If a Matrox P690 card is fitted, then it will occupy the 3rd slot down from the top as shown on the left. There are two versions of this card: one with a high density connector requiring a interface cable (as shown on the left) or one with dual DVI connections.

If fitted, the P690 should be the primary display output, and the display should be attached to this.

If P690 and Matrox cards are both fitted, then the P690 will still be the primary display

If Matrox Mura cards only are fitted, then the primary display will be output 1 on the lower card fitted.

Do not attach any other display until the operating system has been setup. Note that after connecting additional displays to the Mura outputs, the unit will require to be rebooted in order for the new displays to be recognised.

INSTALLATION

ELECTRICAL

The plug on the power supply cord is intended to serve as the power disconnect device. The socket outlet into which this is plugged should be near the equipment, and should remain readily accessible. It is good practice to identify the socket.

If the plug fitted to the power supply cord is removed, the cord should be connected to a suitably installed power disconnect device, by qualified personnel.

For the Dual Redundant version, two power cords are required. In the event of failure of one the modules (including Mains failure) an audible alarm will sound. To disable the audible alarm remove the faulty module for replacement. The unit should continue to work reliably with only one module.

The LEDs on the rear of the Dual Redundant Modules function as follows

- Flashing Green AC mains applied but PC turned off
- Solid Green AC Mains applied and Unit powered on
- Flashing/Solid RED Either Ni AC mains on module or Faulty Module

SIGNALS

All signal connections are on the rear. Connection to the Matrox Mura card is via an octopus type cable with four DVI connections

The Four cables are numbered 1/5, 2/6, 3/7 and 4/8.
When plugged into the Video Out port of the Mura card, they would be assigned in the Matrox PowerDesk as follows (assuming it is the first Mura card in the system)

1/5 – A1
2/6 – A2
3/7 – B1
4/8 – B2

And for the second Mura

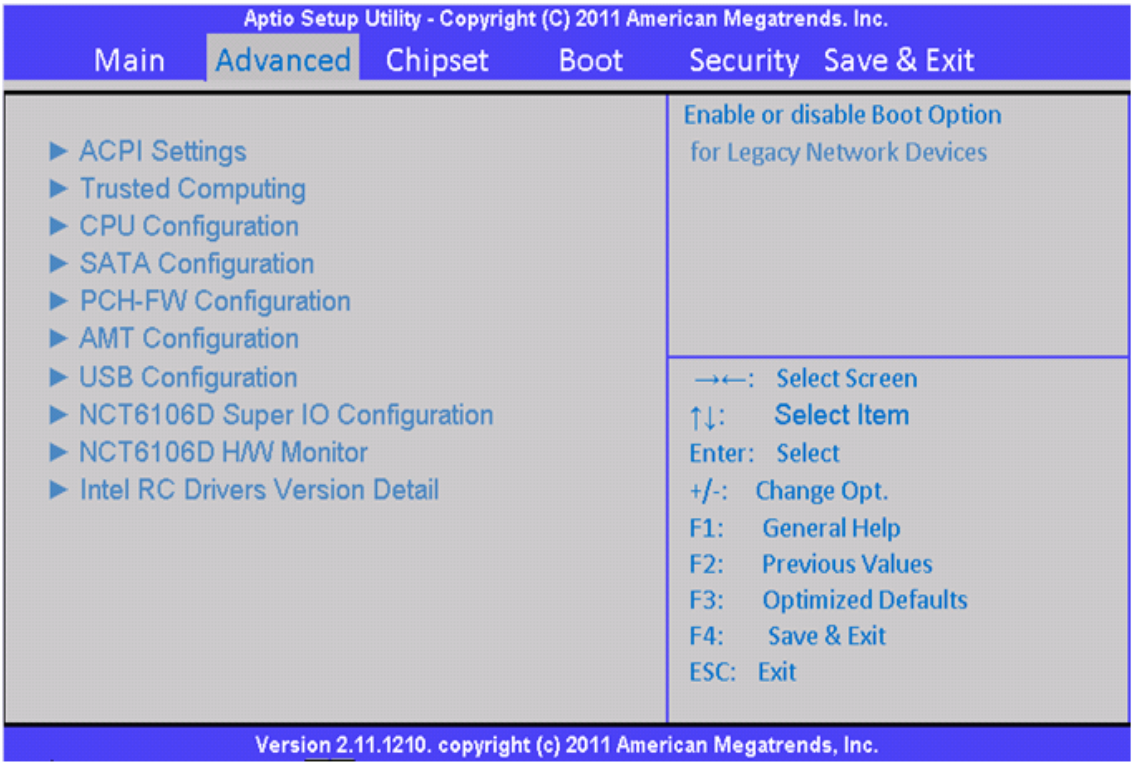
1/5 – C1
2/6 – C2
3/7 – D1
4/8 – D2

If a P690 is also fitted, then the outputs would be E1 and F1 (C1 and D1 if only a single Mura fitted)

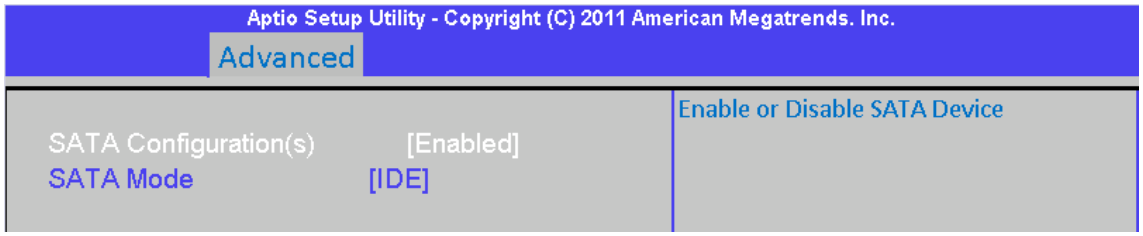
BIOS SETTINGS

Most BIOS settings should not need to be changed by the end-user, however in the event of loss of CMOS settings then the following would need to be set in order to operate as before

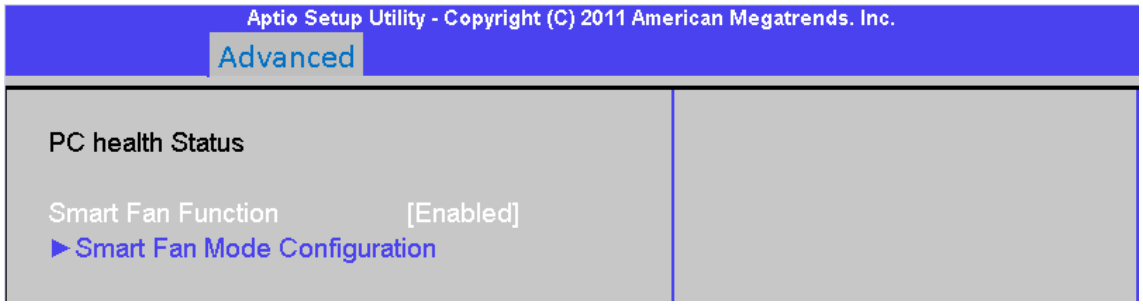
Access to the BIOS is by pressing the <DEL> key during POST. Navigate to the ADVANCED page



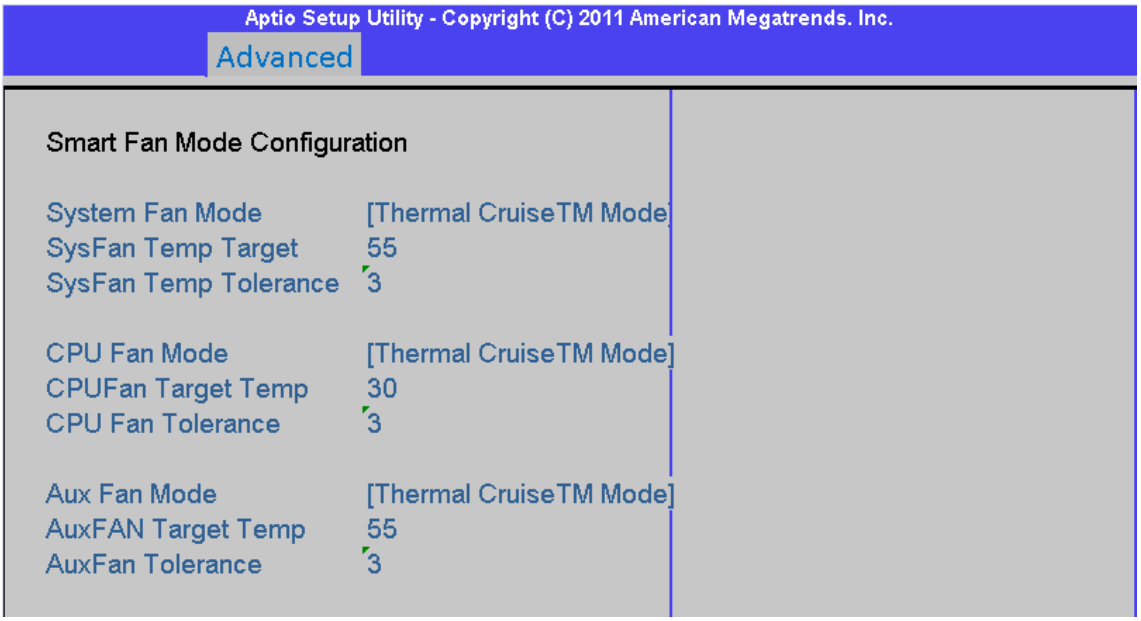
First in the Advanced section select SATA Configuration, then select IDE Mode for the SATA MODE option


Aptio Setup Utility - Copyright (C) 2011 American Megatrends. Inc.
Advanced
SATA Configuration(s) [Enabled]
SATA Mode [IDE]
Enable or Disable SATA Device

Next in the NCT6106D H/W Monitor, set the threshold temperature for the CPU fan to start


Aptio Setup Utility - Copyright (C) 2011 American Megatrends. Inc.
Advanced
PC health Status
Smart Fan Function [Enabled]
▶ Smart Fan Mode Configuration

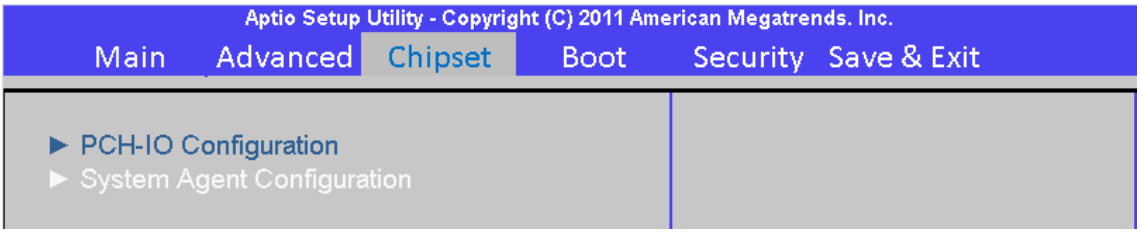
Enter Smart Fan Mode Configuration

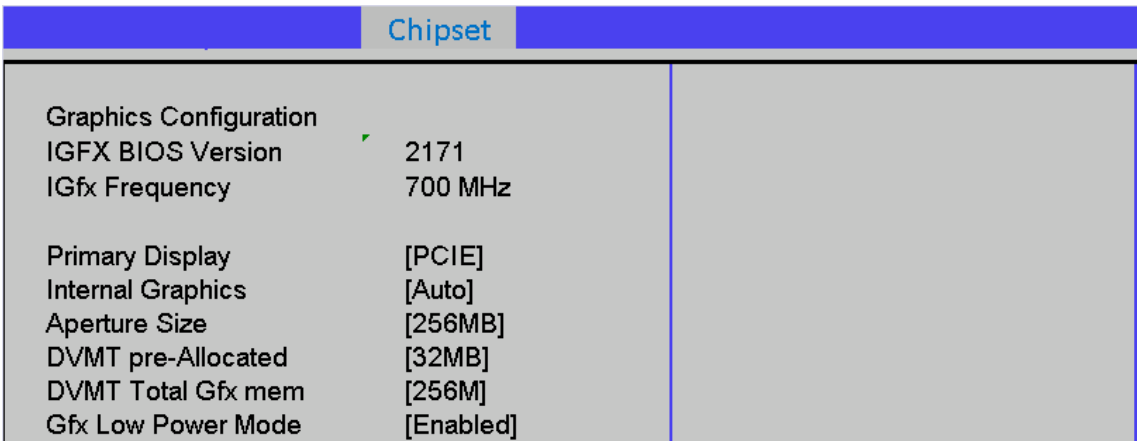

Aptio Setup Utility - Copyright (C) 2011 American Megatrends. Inc.
Advanced
Smart Fan Mode Configuration
System Fan Mode [Thermal CruiseTM Mode]
SysFan Temp Target 55
SysFan Temp Tolerance 3
CPU Fan Mode [Thermal CruiseTM Mode]
CPUFan Target Temp 30
CPU Fan Tolerance 3
Aux Fan Mode [Thermal CruiseTM Mode]
AuxFAN Target Temp 55
AuxFan Tolerance 3

Change the Default CPUFan Target Temp from 55 to 35.

When the unit powers on, the fan will run but will be quieter, but as the temperature starts to rise inside the unit the fan will speed up to help keep the inside temperature lower. If noise is not a consideration then thus setting can be lowered to 30.
For a really warm enclosed space, it would be better to leave the SMART FAN FUNCTION as DISABLED. This will allow the fan to operate at its full potential keeping the inside of the unit as cool as possible and will aid longevity of the system.

For the Graphics settings, if a Matrox P690 is fitted in the demo unit, then the Primary Display setting should be set to PCIE in order to set the P690 as the primary boot display. This can be found via the Chipset, System Agent Configuration menu's


Aptio Setup Utility - Copyright (C) 2011 American Megatrends. Inc.
Main Advanced Chipset Boot Security Save & Exit
► PCH-IO Configuration
► System Agent Configuration



MAINTENANCE

PRECAUTIONS

It is recommended that the unit is switched off and any mains cables disconnected before removing any cover. Some systems may incorporate battery-backed power supplies, in which case a failure to switch off the supply may result in internal electronics still receiving power. Note that some components may become hot during operation, and so it is generally good practice to allow the unit to cool before starting any significant internal maintenance work'

WARNING
The electronic assemblies within the unit are susceptible to electrostatic discharge (ESD). Take anti-static precautions before handling, otherwise damage will occur.

TOOLS

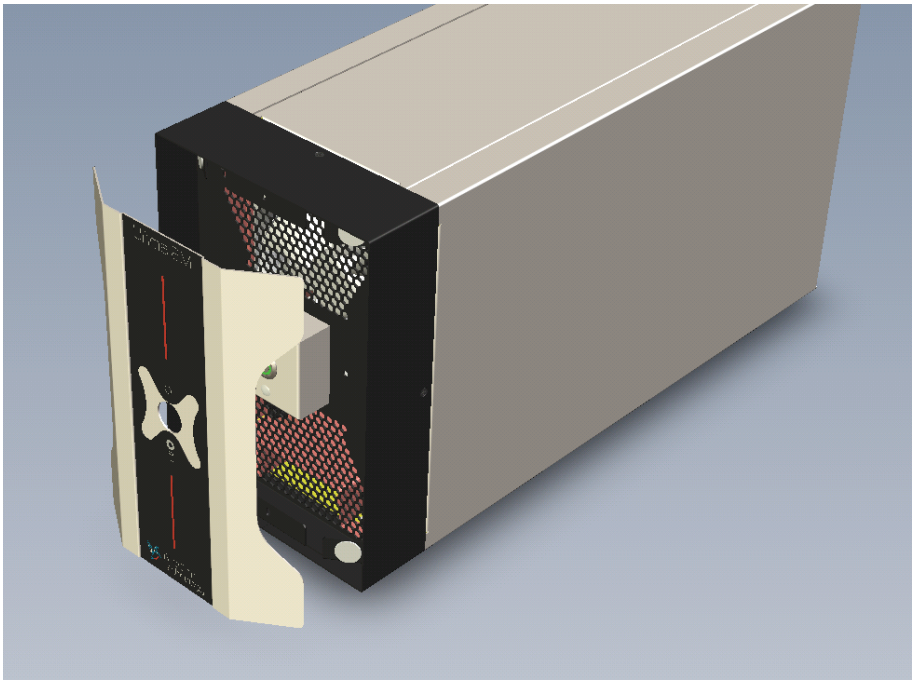
The following readily available standard tools are required to maintain and upgrade the ULTIMA 2M:

- Phillips screwdriver size #2

REPLACING THE FILTER

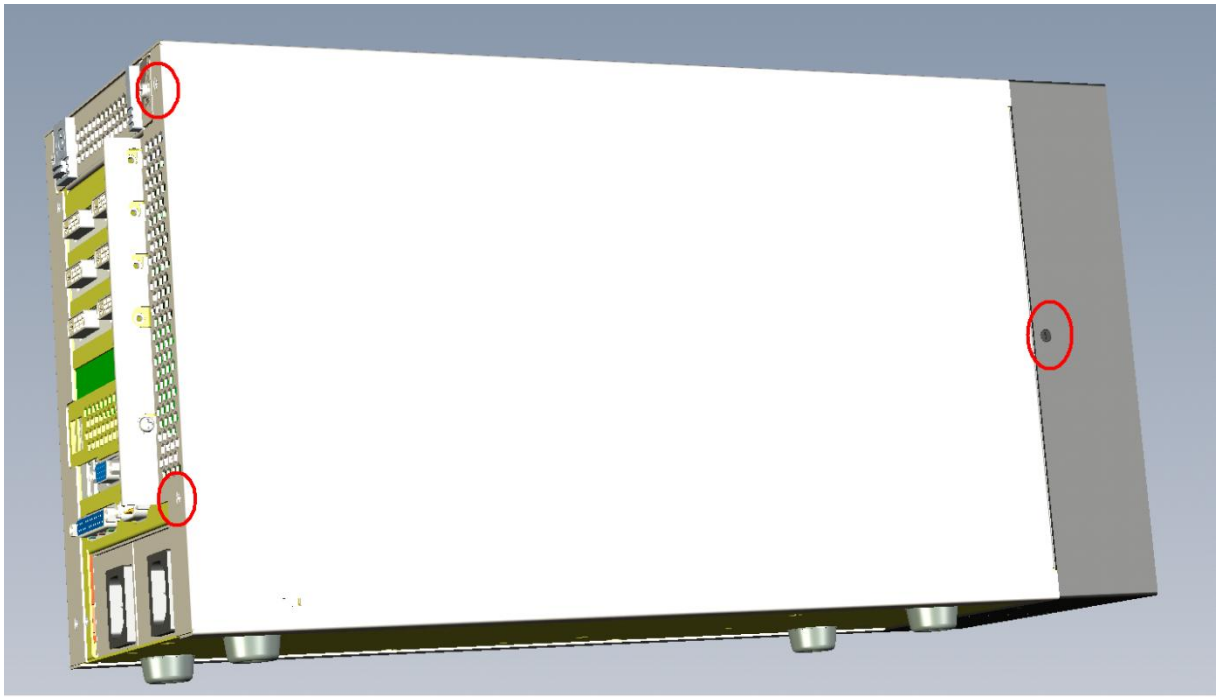
Depending upon environmental conditions, from time to time the inlet filter will need to be cleaned. The air filter is accessible from the front of the chassis, and is located behind the stainless steel front cover. It may be cleaned or replaced.

Referring to picture below, pull the plate forward to break the magnetic contact. The filter is easily accessible. Replace filter into the recess and carefully push the front plate back into position.



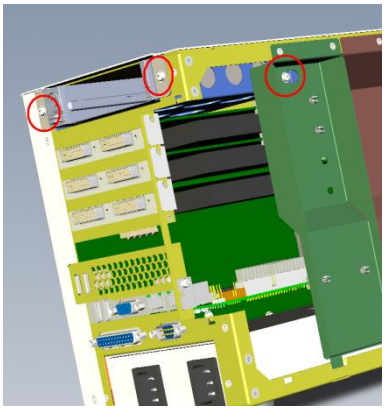
REMOVING THE SIDE COVER

Each side cover is held in place by 3 screws as shown below. When removed, slide the cover back slightly and lift to remove.



REMOVING THE OPTIONAL DRIVE CADDY

The Drive caddy is removable as a single unit to allow for easier upgrade of the hard drives.
Access to the drives is by 2 screws on the rear of the caddy, and each HDD is held in place by 4 screws

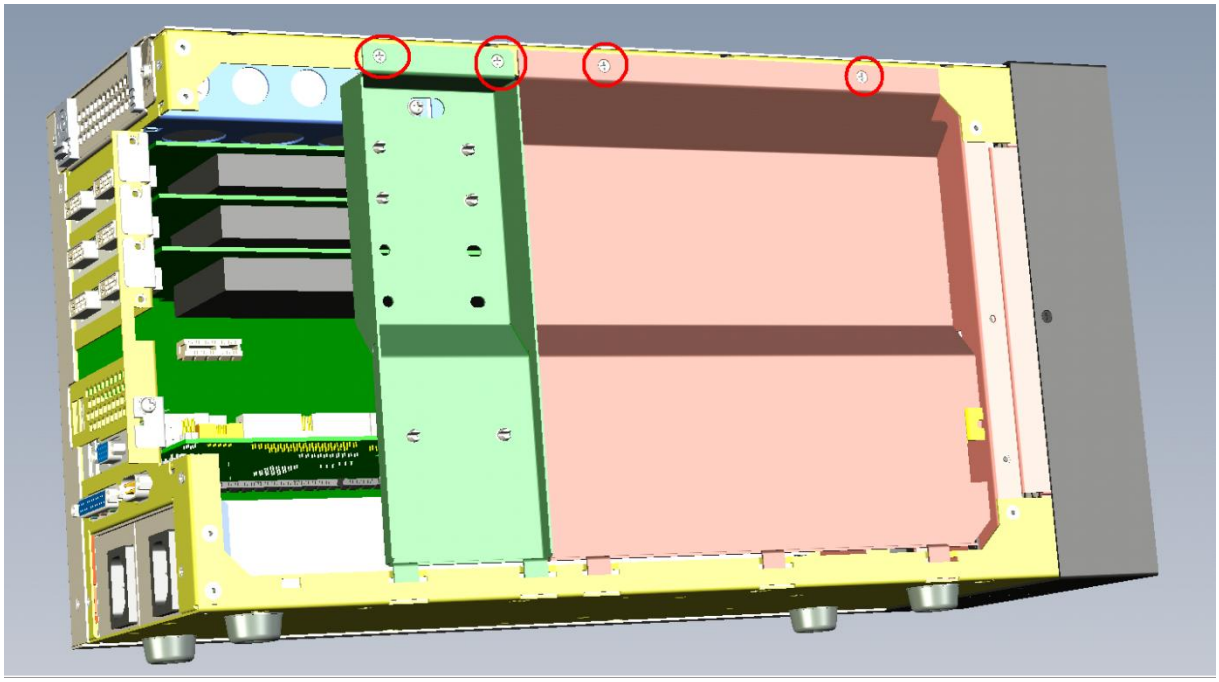


The Caddy base assembly is held in place by 3 screws, two on the rear and one inside. It can then be easily removed or inserted.

IMPORTANT: PLEASE REMOVE POWER BEFORE ATTEMPTING ANY OF THE ACTIONS BELOW.

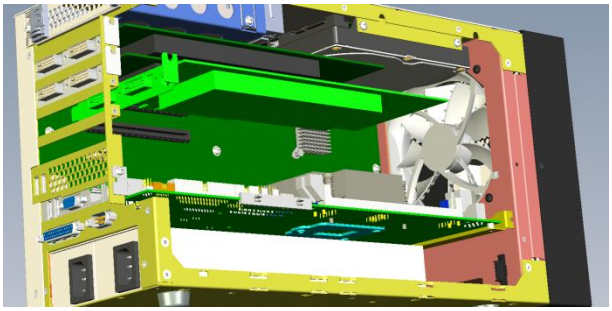
ADDING NEW BOARDS

Remove the side cover, observing anti-static precautions, then remove the internal fan baffle as shown



Identify the back plane connector slot to be used. Remove the corresponding blanking plate in the back panel of the chassis by removing the retaining screw and lifting out.

Position the card and slide the board down the I/O slot until the edge connect contacts the back plane connector. Press the board firmly into place.



Note that the lower end of the metal bracket has to be pushed into a spring clip just below the level of the back plane. This is designed to improve the EMC performance of the system.

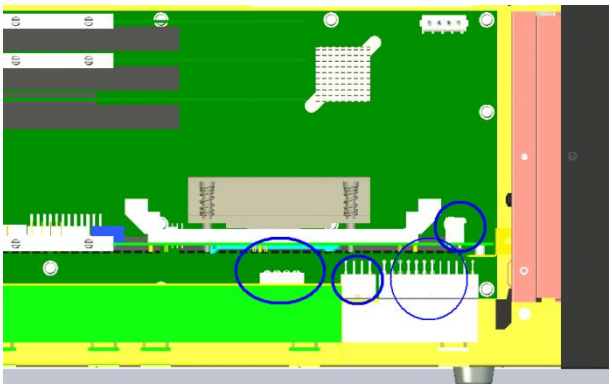
Fasten the metal bracket into place using the screw removed earlier. Replace the fan baffle

REPLACING THE PSU

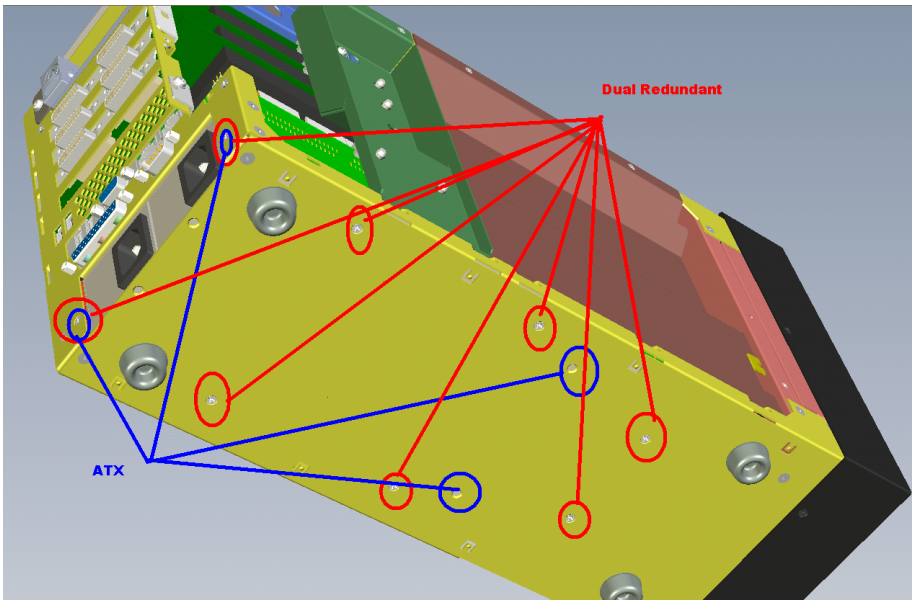
To remove the power supply unit, first ensure that the power supply is switched off and the power cord(s) removed. .

Remove both side covers and the fan baffle as described previously.

Disconnect all the DC output leads from the single board computer (single cable) and the backplane (three cables). There is no need to disconnect power to the HDD(s). [Note that for the dual redundant PSU, due to its length some of the cables on the back plane may only be accessible after the PSU is removed partially]



At the rear of the chassis, remove the two screws holding the body of the PSU in place.



On the underside of the chassis a number of screws will need to be removed depending on the PSU type. For the Dual redundant, there are six screws and for the standard ATX type there are two screws as shown above.

Replacement is a reversal of the removal process.

AMENDMENT HISTORY

Issue Level	Issue Date	Author	Amendment Details
1.0	Feb 2014	T MCK	Release of Ultima 2M configuration
1.1	Feb 2014	T MCK	Added quick start info
1.2	Feb 2014	T MCK	Added Dual Redundant Audible Alarm note